REMARKS

Claims 11-18 are pending in the application. By this paper, claim 11 has been amended. Also, claims 1-10 and claims 19-20 from non-elected groups have been formally cancelled. Reconsideration and allowance of the application in light of the arguments and amendments herein are respectfully requested.

On June 16, 2005 an interview was conducted between the undersigned attorney and the examiner. Amendments to claim 11 were discussed along with two references, U.S. patent no. 5,971,046 and U.S. patent publication no. 2005/0011257A1. The substance of the remarks made to the examiner is reprinted below.

The present invention relates to a tire pressure monitor adhesive system. The adhesive system is for use with a tire pressure monitor (TPM). The TPM is a component of a tire pressure monitoring system of a vehicle. The adhesive system may be used for mounting a tire monitor to a wheel or tire of the vehicle.

Tire pressure monitors are physically heavy in mass. Typically, a TPM has a housing containing electronic components and a battery. Given the extreme forces of rotation as the wheel turns and bounces over bumps or holes, a TPM needs to be securely retained to the wheel or tire.

In conventional applications, clamp-on tire monitors have been used. A clamp-on TPM is attached to a valve stem for the tire. When the wheel is assembled, before the tire is mounted to the wheel, the valve stem is passed through a hole in the wheel. Lock nuts are tightened on the inside and outside of the wheel to securely hold the TPM in place. This conventional system works very well, but requires extra steps and parts for assembly. During assembly, the lock nuts and other hardware must be combined with the TPM and wheel. The TPM must be mounted manually, making the process slow and labor-intensive.

More and more vehicles are being equipped with TPM systems. Such systems are included on more and more vehicles. Thus, there is a strong desire to reduce the cost of materials and assembly. Further, the process has to be automated and the assembly time reduced.

One possibility for mounting a TPM without a clamp-on valve stem is to use an adhesive. However, as noted, the forces on a TPM are tremendous. Suitably strong adhesives are available, but they require a long cure time, such as 10-12 hours. Use of such an adhesive would require that (1) the adhesive be applied to the tire monitor and wheel assembly, (2) the tire monitor would be adhered to the wheel assembly, and (3) the adhesive would be allowed to cure, for 10-12 hours. During the cure time, all further assembly must stop so that a reliable adhesion is achieved. Since auto manufacturers need to reduce assembly time, use of just a strong adhesive such as this has not been possible.

The inventor of the present application realized that what is needed is an adhesive system including more than one adhesive. A first "quick stick" adhesive will hold the TPM in place while a second adhesive cures—10-12 hours. The second, stronger adhesive will work during the operational life of the TPM, essentially permanently bonding the TPM to the wheel with a hold sufficient to retain the TPM during the difficult operating conditions faced by a TPM. This system, however, would permit the assembly of the wheels and the vehicle to continue without having to wait for the strong adhesive to cure. The strong adhesive cures while assembly continues and the TPM is held in place by the "quick stick" adhesive.

Accordingly, claim 11 defines an adhesive system which comprises two adhesives. The first adhesive is "quick stick" or has a short cure time. The second adhesive has a long cure time. Claim 11 has been amended to clarify that the first adhesive is for retaining the housing of the TPM on the surface of the wheel during assembly. Support for this amendment may be found at paragraph [0023] of the application as filed. Claim 11 has also been amended to recite that the second adhesive—the strong adhesive—is for retaining the housing of the TPM on the wheel during operation of the TPM. Support for this amendment may be found at paragraph [0019] of the application as filed. Adhering the housing to the wheel or tire is advantageous because it reduced the number of parts required, simplifies assembly and reduces assembly cost.

Claim 11 has further been amended to clarify that the invention relates to "A tire pressure sensor adhesive system for a tire pressure sensor mountable on a wheel of a vehicle." Support for this amendment may be found at paragraph [0002] of the application as filed. Claim 11 has still further been amended to recite that the tire pressure sensor includes a housing containing a tire pressure sensing circuit. Support for this amendment may be found at paragraph [0021] of the application as filed. No new matter is added by any of the amendments herein.

Cited references

In the Office Action, Claims 11-18 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. patent number 4,620,127 to Chung ("Chung"). Chung actually relates to a kinescope-yoke assembly for a video monitor. Chung discloses use of a fast curing adhesive in combination with a slow curing adhesive (column 4, line 64 – column 5, line 7).

Reconsideration of this rejection in light of the amendments herein is respectfully requested. Chung fails to disclose "A tire pressure sensor adhesive system for a tire pressure sensor mountable on a wheel of a vehicle," as recited by amended claim 11. Moreover, Chung fails to describe an adhesive system with a first adhesive for retaining the housing of the tire pressure sensor on the surface of the wheel during an assembly operation involving the wheel," and a second adhesive for retaining the housing of the tire pressure sensor on the surface of the wheel during operation of the tire pressure sensing circuit." Chung identifies characteristics of a desirable adhesive, column 1, line 30 – column 2, line 5, but none of those characteristics matches the limitations of amended claim 1. Accordingly, withdrawal of the rejection over Chung is respectfully requested.

Filed with this amendment is an Information Disclosure Statement under 37 C.F.R. § 1.97 disclosing three references: U.S. patent number 5,971,046 to Koch, et al. ("Koch"); U.S. patent publication number US 2005/0011257 A1 to Modawell, et al. (Modawell); and French patent publication number 2 839 016.

Koch discloses attaching a TPM to a tire using a rubber patch. A two-step process is used. First, the TPM and the patch are allowed to cure to form an assembly (column 5, lines 22-47). This cure time is, for example, at least 30 minutes and requires an elevated temperature of 75-90 deg. C. Next, the patch is assembled to the inner side of the tire. The patch must then be "stitched" or cured to form a strong bond, processes which require substantial time and manual labor. Koch even says the TPM can be clamped to the tire during curing, another process needing manual intervention and adding delay to the assembly process. Koch thus fails to disclose using an adhesive system as defined by claim 11, including a first adhesive for retaining the TPM during an assembly operation of the wheel. Koch acknowledges the problem that arises due to extended cure times for TPM adhesives, but suggests a clamp for retaining the TPM. This does not fulfill the requirements of automating the assembly and reducing assembly time.

Modawell shows an adhesive pad 30 attaching a bracket 28 to a wheel. The TMP housing attaches to the bracket 28. Modawell fails to disclose use of an adhesive system including, for example, two adhesives. It is submitted that either Modawell's adhesive pad will not be strong enough to hold the bracket in place when the vehicle is moving and the wheel is turning, or the adhesive being used will require a long cure time and is therefore incompatible with a modern manufacturing process. Moreover, Modawell shows using a bracket 28 for mounting the TPM, rather than attaching the housing directly to the wheel using the adhesive system, as provided in claim 11. As noted above, the presently claimed invention provides for adhering the housing directly to the wheel or tire. This reduces the number of parts that must be combined during assembly, eliminating, for example, the bracket introduced by Modawell. Modawell thus fails to disclose all the limitations of the invention defined by claim 11.

French patent publication number 2 839 061 is also cited in the attached Information Disclosure Statement. This reference shows a tire monitor having a base which consists of a plate (100) that can be glued or welded to a wheel rim and is fitted with a releasable clamp (1) for a pressure sensor housing (200). The clamp has hook shaped projections that engage with matching recesses in the housing, with the assembly preferably made from heat-treated steel. The base consists of a plate (100) that can be glued or welded to a wheel rim and is fitted with a releasable clamp (1) for a pressure sensor housing (200). The clamp has hook-shaped projections that engage with matching recesses in the housing, with the assembly preferably made from heat treated steel. The plate is made with a groove (110) and a radius of curvature matching that of the wheel rim, and it can be fixed in place with a polymerizable adhesive, with the temperature raised while a pressure is applied to the plate, and reduced after polymerization.

This document fails to show adhesion of a TPM housing to a wheel, as recited by claim 1. Rather, this document teaches adhesion of a plate (200) to which the TPM housing is clamped. As noted above in the discussion of Modawell, using a plate or bracket adds extra parts and requires additional labor during manufacturing. In contrast, by adhering the TPM housing directly to the wheel, parts count is reduced, manufacturing time and costs are reduced, all in accordance with the present invention.

Accordingly, withdrawal of the rejection of claims 11-18 and allowance of the application is respectfully requested.

With this response, the application is believed to be in condition for allowance. Should the examiner deem a telephone conference to be of assistance in advancing the application to allowance, the examiner is invited to call the undersigned attorney at the telephone number below.

Respectfully submitted,

John G. Rauch

John G. Rauch
Registration No. 37,218
Attorney for Applicant

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BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200